REMARKS

Claims 1 – 14 are pending in the present application. Applicants amend claims 1 and 9.

No new matter is added. Support for the amendments may be found, for example, at page 2, lines

5 – 15, page 7, lines 28 – 30 and page 8, lines 16 – 24.

ALLOWED CLAIMS

Applicants thank the Examiner for indicating that claims 5 – 8 and 12 – 14 are currently

allowed.

REJECTIONS UNDER 35 U.S.C. § 103

Claims 1 – 4 and 9 - 11 are rejected under 35 U.S.C. § 102(e) as being anticipated by

U.S. Patent Publication No. 2001/0056490 to Nagami et al. Applicants amend independent

claims 1 and 9 to clarify the nature of their invention, and respectfully traverse this rejection.

In our Response of September 16, 2004, Applicants made the following arguments:

In a Preliminary Amendment of April 22, 2004, Applicants made the following
arguments:

> In independent claims 1, 5, 9 and 12, Applicants disclose a packet transfer
> apparatus for switching and transferring a cell or frame signal between first
> and second nodes and a routing device. Applicants' claimed apparatus
> includes a switch, a memory and a shortcut controller. Applicants' shortcut
> controller dynamically caches outgoing route data transmitted by routing
> device to the second node over a predetermined connection path, and
> determines whether incoming cell or frame signals to the switch contain
> outgoing route information that matches to a outgoing route information
> cached in the memory.

> If a match is found, the shortcut controller causes the switch to transfer the cell
> or frame signal from the first node to the second node via a shortcut and
> without routing the cell signal via the predetermined connection path to and
> from the routing device (see, e.g., page 8, lines 25 through 35 of Applicants'
> specification). If a match is not found, outgoing route data for the input cell is
> cached into the memory after being routed by the routing device through the
> predetermined connection path. Alternatively, Applicants' shortcut controller

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as claimed in claims 5 and 12 caches source data from input cells arriving at the second node for use as outgoing route information.

Nagami discloses a system for transferring IP packets over ATM networks via virtual connections, in which a router connecting two ATM networks has memory means for storing a correspondence between a virtual connection used in the network of a transmitting user and a virtual connection used in the network of the receiving user. The Examiner compares elements 203 – 206 of Nagami's router (FIG. 4) to Applicants' shortcut controller, and elements/process steps t2, t3 of Nagami's router to Applicants' cached memory.

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As illustrated in FIG. 7 of Nagami, routing tables for L3 processing (tables t2 to t4) are used for routing of frames and packets between nodes, for example, via dedicated virtual channels. The routing tables are updated by messaging (e.g., bypass pipe setup and bypass pipe release messages) between adjacent routers (see, e.g., FIG. 13 of Nagami).

In sharp contrast, Applicant's claimed invention monitors information for cells routed by the router associated with Applicants' switch, and dynamically caches associated information identifying output connection IDs produced by the router with a corresponding cell or frame information. Unlike the system of Nagami, standard cache algorithms employed by Applicants' claimed invention keep data current in the cache without the need for more complex messaging, and no frame assembly is needed to form L3 packets in order to determine next hop routing. As a result, bypass routing can be executed much more quickly and directly.

Applicants note that the process of Nagami referenced by the Examiner for establishing a switched bypass path (paragraph 369, Figure 40) is one in which the router establishes a VC for a next hop to a next stage router upon determining that an arriving packet is not associated with a bypass path. While FIG. 47 of Nagami discloses a procedure by which a transmission terminal 602 performs routing of a data packet with reference to a destination management table 629 and without immediate reference to a router, unlike Applicants' claimed cell signal switching apparatus, the terminal 602: (a) does not include a switch that has a fixed or semi-fixed predetermined connection to a router, (b) does not cache data received from a second node and transmitted to the switch from the router via this path, and (c) does not then have means for subsequently using the cache data to form a shortcut for transmitting a cell signal to the second node without routing the cell signal via the router.

As FIG. 4 of Nagami illustrates a configuration of each router in the disclosed network, it does not in comparison to Applicants' claimed cell signal switching apparatus include the combination of a switch coupled via a predetermined

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connection path to a router, wherein the switching apparatus in addition includes a memory and a shortcut controller. Rather, FIG. 4 of Nagami simply illustrates components <u>configured in the router.</u> Thus, unlike Applicants' claimed apparatus, the components of FIG. 4 do not provide means for bypassing routing of cell signals to the router.

The Examiner finds these arguments unpersuasive, suggesting that Nagami's router includes a shortcut controller (items 203 – 206 of FIG. 4) and memory (items S2, T1 and S6) that serve as an adjunct to a switch (item 202 of FIG. 4). The Examiner further suggests that Nagami's router dynamically caches outgoing routing data as layer 2 output data determined from a layer 3 analysis (step S11 of FIG. 7). The Examiner also suggests that the network layer switch in FIG. 4 of Nagami is fixedly connected to the datalink switch of FIG. 4, and that FIG. 7 of Nagami shows caching of data from input cell signals received from the second node as outgoing route data without accessing routing elements. Applicants respectfully disagree.

Applicants respectfully submit that items 203 – 206 of FIG. 4 are more properly compared to the <u>routing device</u> connected to the claimed cell signal switching apparatus rather than to Applicants' claimed shortcut controller. If a comparison to the shortcut controller is none-the-less made, Nagami then fails to disclose in addition a routing device connected over a predetermined path to the switch 202 such that <u>routing data from the routing device is cached in a memory by a shortcut controller.</u> In other words, unlike Applicants' claimed invention, Nagami fails to disclose a shortcut controller that serves as an adjunct <u>both</u> to the routing device <u>and</u> to the switch for <u>caching routing information determined by the router</u> in a cache memory of the switch.

With reference to step S11 of FIG. 7, the Examiner suggests that Nagami discloses dynamically caching outgoing routing data as layer 2 output data determined from a layer 3 analysis (steps S11, S12 of FIG. 7). While Nagami discloses in paragraph 175 that an L2 frame is <u>converted</u> from an L3 packet, Applicants respectfully submit that Nagami provides no explicit indication that a resultant L2 address is in anyway <u>cached</u> as a result of the conversion.

With respect to claims 1 – 4 and 9 – 11, the Examiner finds these arguments to be

unpersuasive. Specifically, he suggests that FIGs. 4, 54 and 55 of Nagami disclose a structure

that is similar to the structure claimed by Applicants in independent claims 1 and 9, such that

layer-2 packet switching is performed at layer-2 by the datalink layer switch unit (including the

functionality of Applicants' claimed switch, memory and shortcut controller) if the routing

information has been previously determined, and is otherwise processed at layer-3 by the router

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to determine the appropriate routing. With reference to paragraphs 174 and 369 of Nagami, the Examiner further suggests that Nagami teaches that the processed layer-2 routing data (as determined from layer-3 routing data) is cached in order to facilitate bypass switching.

Paragraph 174 of Nagami discloses a process by which layer-2 addresses are resolved from layer-3 addresses by using address resolution protocol (ARP). See, e.g., step S11 of FIG. 7. Using ARP, the level-3 address of a destination host is broadcast in an ARP message to reach the destination host in order to obtain a reply identifying a level-2 or physical address for the destination host. The result is used to update an associated address conversion table (see, e.g., table t2 and step S12 in Nagami's FIG. 7). The table t2 of Nagami is effectively used in a level-3 processing stage which is defined by steps S3 – S12 of Nagami prior to converting an associated level-3 packet back into a level-2 frame.

Thus, according to the method of Nagami, level-2 route data is obtained by performing level-3 processing, during which processing an ARP message is broadcast to the destination host to obtain level-2 route data as is returned by the destination host. Applicants respectfully submit that this method is fundamentally different from the caching operation claimed by Applicants.

Specifically, according to the present invention, the cell signal switching apparatus simply extracts level-2 route data from a cell signal that is transmitted to the cell signal switching apparatus by an external routing device, and temporarily stores (caches) this extracted level-2 routing data as shortcut data, without executing any associated messaging to discover the level-2 routing data. In other words, the cell signal switching apparatus performs its caching of outgoing route data autonomously, without making specific route information requests to other network elements (for example, such as Nagami's destination host).
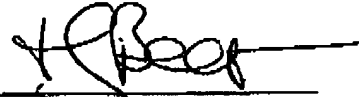
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Applicants amend independent claims 1 and 9 to clarify that the shortcut controller autonmously caches outgoing cell data obtained from the input cell signal. Applicants respectfully submit that, for at least the above-described reasons, amended independent claims 1 and 9 are not anticipated by Nagami, and therefore stand in condition for allowance. As claims 2-4 and 10 – 11 respectively depend from allowable claims 1 and 9, Applicants respectfully submit that claims 2- 4 and 10 – 11 stand in condition for allowance for at least this reason.

CONCLUSION

An earnest effort has been made to be fully responsive to the Examiner's objections. In view of the above amendments and remarks, it is believed that claims 1 – 14, which include independent claims 1, 5, 9 and 12 and the claims that depend therefrom, stand in condition for allowance. Passage of this case to allowance is earnestly solicited. However, if for any reason the Examiner should consider this application not to be in condition for allowance, he is respectfully requested to telephone the undersigned attorney at the number listed below prior to issuing a further Action.

Any fee due with this paper may be charged on Deposit Account 50-1290.

Respectfully submitted,

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